

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

LEE KOCK HUAT et al.

Patent No.: US 6,867,483 B1

Issued: March 15, 2005

U.S. Appl. No.: 09/909,934

Filed: July 20, 2001

For: STRESS-FREE LEAD FRAME

Confirmation No.: 2402

Examiner: David A. Zarneke

Art Unit: 2829

**REQUEST FOR CERTIFICATE OF
CORRECTION UNDER 37 CFR § 1.322**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 CFR 1.322, Applicant submits a Request for Certificate of Correction correcting printing errors made at the time of printing of the patent. The desired corrections are set forth on the enclosed form PTO/SB/44. A Supplemental Notice of Allowability mailed by Examiner David Zarneke on December 7, 2004 noted that claims 1-37 of the present application were allowed and included an Examiner's Amendment and an Interview Summary of an interview between Applicants and the Examiner on November 30, 2004. The Examiner's Amendment amended claims 1-8 to remove the term "stress free" from the preamble of the claims while the Interview Summary indicated that claims 9-31, which were previously subject to a Restriction Requirement, were allowed. The granted patent does not properly reflect either of these decisions. Accordingly, as printed claims 1-8 have typographical errors, examined, allowed claims 9-31 were omitted from the printed patent and allowed claims 32-37 were incorrectly numbered as claims 9-14 and thus also have typographical errors.

It is believed that no fee is required for this Request for Certificate of Correction as the errors are the result of mistakes made by the United States Patent and Trademark Office. However, if a fee is required, the Commissioner is authorized to charge said fee to the undersigned's Deposit Account No. 20-1430.

Respectfully submitted,

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 INVENTOR(S) : Huat et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

1. A stress-free lead frame comprising:
 a plurality of integrated circuit areas, each of said plurality of integrated circuit areas having a die pad and a plurality of leads; and
 a peripheral pad surrounding said plurality of integrated circuit areas, the peripheral pad comprising first and second parallel opposing support bars and third and fourth parallel opposing support bars arranged orthogonal to the first and second opposing support bars;
 said peripheral pad being provided with a plurality of stress-relief openings alone each of the first, second, third and fourth support bars.
2. A stress-free lead frame as claimed in claim 1 wherein the peripheral pad further comprises:
 a plurality of interlocking means along the first, second, third and fourth support bars.
3. A stress-free lead frame as claimed in claim 1 wherein said plurality of stress-relief openings comprises holes and slots, each hole being a non-elongated opening and each slot being an elongated opening.
4. A stress-free lead frame as claimed in claim 3 wherein said holes and slots are arranged in multiple rows.
5. A stress-free lead frame as claimed in claim 2 wherein each of said interlocking means comprises a plurality of slots, each slot being an elongated opening.
6. A stress-free lead frame as claimed in claim 4 wherein said holes and slots are arranged side by side at equal intervals.
7. A stress-free lead frame as claimed in claim 5 wherein said holes and slots are arranged side by side at equal intervals.
8. The stress-free lead frame as claimed in claim 1 wherein the peripheral pad further comprises a plurality of positioning holes on the first and second support bars.
9. A lead frame strip for use in making an integrated circuit die package, the lead frame strip comprising: an outer frame having a plurality of elongated stress relief openings around the circumference of the outer frame;
a plurality of horizontal and vertical connecting bars attached to the other frame and defining a plurality of inner frames arranged in a matrix pattern within the outer frame, each inner frame comprising a die pad and a plurality of tabs arranged around the die pad.
10. The lead frame of claim 9 wherein the outer frame further comprises a plurality of non-elongated holes around the circumference of the outer frame.
11. The lead frame of claim 9 wherein the outer frame comprises a plurality of rows of elongated openings around the circumference of the outer frame.

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12. The lead frame of claim 11 wherein the outer frame further comprises a plurality of non-elongated holes around the circumference of the outer frame, the non-elongated holes being arranged in a row distinct from the plurality of rows of elongated openings.
13. The lead frame of claim 11 wherein the plurality of elongated openings in at least one of the plurality of rows of elongated openings are regularly spaced along each portion of the outer frame.
14. The lead frame of claim 11 wherein the outer frame comprises at least three rows of elongated openings around the circumference of the outer frame.
15. The lead frame of claim 14 wherein the three rows of elongated openings comprise a first row, a second row and a third row between the first and second rows, and wherein the first row has a plurality of elongated openings that are substantially the same size and shape as a corresponding plurality of elongated openings in the second row.
16. The lead frame of claim 15 wherein the third row comprises a plurality of elongated openings offset from the plurality of elongated openings in the first and second rows such that it is possible to draw a line orthogonal to the plurality of rows that intersects one of the elongated openings of the third row without intersecting an elongated opening in the first or second rows adjacent to the third row.
17. The lead frame of claim 16 wherein the outer frame further comprises a plurality of non-elongated holes around the circumference of the outer frame, the non-elongated holes being arranged in a row between the first and second rows of elongated openings.
18. The lead frame of claim 17 wherein the plurality of non-elongated holes are offset from the plurality of elongated openings in the first and second rows such that it is possible to draw a line orthogonal to the plurality of rows that intersects one of the holes without intersecting an elongated opening in the first or second rows adjacent to the third row.
19. The lead frame of claim 9 wherein the outer frame further comprises a plurality of positioning holes located outside the plurality of rows of elongated openings.
20. The lead frame of claim 9 wherein the outer frame has a rectangular shape.
21. A lead frame strip for use in making an integrated circuit die package, the lead frame strip comprising:
an outer frame having a plurality of stress relief openings around the circumference of an inner portion of the outer frame and a plurality of positioning holes along an outer portion of the outer frame;
a plurality of horizontal and vertical connecting bars attached to the outer frame and defining a plurality of inner frames arranged in a matrix pattern within the outer frame, each inner frame comprising a die pad and a plurality of tabs arranged around the die pad.

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22. The lead frame strip of claim 21 wherein the plurality of stress relief openings comprise a plurality of rows of openings.
23. The lead frame strip of claim 22 wherein the plurality of rows of openings comprise at least one row comprising a plurality of elongated openings.
24. The lead frame strip of claim 23 wherein the plurality of elongated openings comprise a plurality of regularly spaced elongated openings.
25. The lead frame strip of claim 23 wherein the plurality of rows of openings comprise at least one row comprising a plurality of non-elongated holes.
26. The lead frame strip of claim 25 wherein the plurality of non-elongated holes comprise a plurality of regularly spaced non-elongated holes.
27. The lead frame strip of claim 21 wherein the plurality of stress relief openings comprise a plurality of rows of elongated openings and at least one row of non-elongated holes.
28. The lead frame strip of claim 27 wherein the plurality of rows of elongated openings comprises a first row and a second row and wherein the first row has a plurality of elongated openings that are offset from the plurality of elongated openings in the second row.
29. The lead frame strip of claim 27 wherein the plurality of rows of elongated openings further comprises a third row and wherein the third row comprises a plurality of elongated openings that are substantially the same size and shape as a corresponding plurality of elongated openings in the first row.
30. The lead frame strip of claim 21 wherein the plurality of stress relief openings comprise at least one row of elongated openings that are elongated in the direction of the row.
31. The lead frame strip of any one of claims 21-30 further comprising encapsulant covering the die pad and plurality of tabs within each of the plurality of inner frames and covering the plurality of stress relief openings around the circumference of the inner portion of the outer frame.

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[[9]]32. A method of manufacturing a plurality of integrated circuit packages, the method comprising:
 providing a lead frame strip comprising (i) an outer frame having a plurality of stress relief openings around a circumference of an inner portion of the outer frame and a plurality of positioning holes along an outer portion of the outer frame, and (ii) a plurality of horizontal and vertical connecting bars attached to the outer frame and arranged in a manner that defines a plurality of inner frames arranged in a matrix pattern within the outer frame, each inner frame comprising a die pad and a plurality of leads arranged around the die pad;
 placing an integrated circuit die on each die pad, and for each integrated circuit die, electrically connecting the integrated circuit die to the plurality of leads surrounding its respective die pad;
 applying encapsulant material over the lead frame strip so that the plurality of inner frames including each integrated circuit placed on each die pad within the plurality of inner frames and the plurality of stress relief openings are covered by the encapsulant material;
 severing individual integrated circuit packages from the lead frame strip to create the plurality of integrated circuit packages.

[[10]]33. The method of claim [[9]]32 wherein the step of applying encapsulant material comprises heating pellets of encapsulant material placed in a mold to liquefy the material.

[[11]]34. The method of claim [[10]]33 wherein the plurality of stress relief openings comprise a plurality of rows of openings.

[[12]]35. The method of claim [[11]]34 wherein the plurality of rows of openings include a plurality of rows of elongated openings and at least one row of non-elongated holes.

[[13]]36. The method of claim [[11]]34 wherein the plurality of rows of elongated openings comprises a first row and a second row and wherein the first row has a plurality of elongated openings that are offset from the plurality of elongated openings in the second row.

[[14]]37. The method of claim [[12]]35 wherein the plurality of rows of elongated openings further comprises a third row and wherein the third row comprises a plurality of elongated openings that are substantially the same size and shape as a corresponding plurality of elongated openings in the first row.

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